

OBSERVATIONS  
ON  
IMPEDIMENTS OF SPEECH;  
WITH  
SOME REMARKS  
ON THEIR  
SUCCESSFUL TREATMENT.

IN A LETTER ADDRESSED TO  
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PRESIDENT OF THE WESTMINSTER MEDICAL SOCIETY,  
ETC. ETC.

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BY RICHARD CULL.

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## A LETTER,

*§c.*

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SIR,

AMONG the many maladies to which the human family are liable, the derangements of the functions of voice and speech are not the least afflicting.

The causes of impediments of voice and speech do not appear to have received much investigation from professional men: perhaps this arises from the well known fact, that much superintendence is requisite for their removal, and that the time which would be devoted in giving that attention, which alone is capable of overcoming these defects, could ill be spared by medical practitioners.

Impediments of speech have existed in all

ages, and some persons have been so fortunate as to throw them off by their own efforts, although they have not been able to explain by what means this has been effected. It is an historical fact, that Demosthenes had an impediment in his speech, which he corrected by pronouncing orations, with pebbles in his mouth, by the sea shore. A friend of mine laboured under an impediment in speech until the completion of his eighteenth year, when he resolved to get rid of it, which he certainly did ; and is now a public lecturer, and one of the most eloquent men in this country,— yet he is unable to explain how he effected the removal of the defect.

It is well known to the profession, that many persons, with impediments of speech, can sing, and even read smooth verse, provided they read it in a drawling manner. This point is well illustrated by the following fact :— A plasterer, who had a very distressing stutter—indeed to so great a degree, that he frequently was thrown out of employment in consequence— informed me, that at such times he contrived to get money by wagers in public-houses, that he could sing a song of

several verses without a single recurrence of his defect, while he could scarcely utter a word in speaking without its obtrusion.

The relief which empirics have afforded by chance, and the cases of individuals throwing off stuttering by their own efforts, are useful in shewing the possibility of cure ; and that, if the subject were properly investigated, the permanent removal of every case of impediment, from whatever cause it may proceed, would be rendered highly probable.

Allow me, then, to preface my observations on the nature, causes, and remedies of stammering, and other impediments of speech, by a few remarks on the structure and functions of the parts which form the instruments of voice and speech.

At the root of the tongue lies a small bone, which, from its resemblance to the Greek *v* (u-psilon), is called the hyoid or u-like bone : to this bone is attached a long cartilaginous tube, which extends to the lungs, forming a channel for the conveyance of the air to and from the lungs, constituting breathing.

This tube is called the trachea or windpipe. The part in immediate connection with the hyoid bone is named the larynx: it is generally described as a sort of box placed on the top of the windpipe, and consists of five cartilages—the thyroid, or shield-shaped cartilage, which projects in the front of the neck, and is well known as the *pomum Adami*, or “Adam’s apple;” the two arytenoid cartilages situated behind these, and forming the glottis, or immediate opening from the mouth to the larynx; the cricoid, or ring-like cartilage, serving as a base, and as a connecting piece to join the larynx and trachea together; and the epiglottis, shaped like an artichoke leaf, the office of which is to cover the glottis, and prevent food, or any other matter, from entering the larynx. These cartilages form the larynx, and are severally provided with muscles for its contraction and dilation. The interior of the larynx is lined by a very sensible vascular and mucous membrane, which is a continuation of the membrane of the mouth.

“The voice,” says Richerand, “is an appreciable sound, resulting from the vibra-

tions which the air expelled from the lungs meets with in passing through the glottis. \* \* \* All animals furnished with a pulmonary organ have a voice." Without entering into an investigation of sound, it may here be stated as a well-known fact, that air rushing from the human lungs through the opening at the top of the windpipe, causes the elastic lips of that opening to vibrate, and to excite tremblings in the air which affect the ear with the sensation called sound. From various experiments in the science of acoustics, we are certain that the presence of air is essential to sound; and it has been stated above, that the air striking with force upon an elastic body causes it to vibrate, and to excite tremblings or waves in the surrounding air, which communicating to the ear, produce a peculiar sensation which is denominated sound.

Various explanations have been given of the manner in which the air is rendered sonorous by the larynx. Galen supposed it to result from the alteration of the calibre of the glottis; Dodart revived the idea, and compared it to a flute; while Ferrein explained it by a comparison to a violin, supposing all the

variations of sound to result from different degrees of tension of the *chordæ vocales*. Richerand unites the two explanations, and thus supposes the larynx to act as a wind and as a stringed musical instrument at the same time. It has been compared to a drum, and also to an Æolian harp. It is most probable that the explanation of Richerand is the true one, but a sufficient number of precise observations have not yet been made to determine the question.

The voice can be produced either during inspiration or expiration: it is formed by ordinary speakers during expiration. Ventiloquists at times speak during inspirations in order to modify the sound, which is not so loud, and has a peculiar character, very different from the voice produced during the expiration of the breath.

The larynx, however, is the sole instrument of voice—the lungs being a receptacle, and the trachea a passage for the air to and from the larynx. But if we speak during inspiration, and not during expiration, as in the ordinary manner, the lungs are no longer the

receptacles for air—they do not answer the purpose of the bellows to an organ—nor does the trachea serve as a passage from the receptacles to the organ of voice; for, in this case, although the larynx is still the sole organ of voice, the receptacle is the external world, and the mouth is the air-passage. Thus the whole arrangement is reversed, and cold air instead of warm is used, which is thrown into the larynx at the top instead of the bottom. If we pronounce the words—fancy, absolute, city, hearken, we find a sort of percussion on the first syllable of each word: this quality of voice is also felt on the second syllable of the following words—discover, reply, preserve, destroy, &c.; on the third of the following words—antimonial, approbation, &c. This particular character which affects certain syllables, is called by grammarians accent, when they treat of accent; and it is also by the same individuals called emphasis, when they treat of emphasis. This quality is given to syllables by a certain action of the larynx, which it is impossible to duplicate without a pause between; there cannot be two syllables sounded during this action, although several can be sounded during the

re-action, as in the following illustration from Burns,—

“ The *small* birds *rejoice* in the *green* leaves *returning* : ”

Where the syllables in italic are characterized by this peculiar force, and are spoken under this action of the larynx ; the other syllables being pronounced during its re-action. It will be observed, that if a word, whose first syllable is said to be accented, be spoken, the voice is formed without any sensible preparatory motion of the larynx, as in the words—fancy, city, &c. ; but in order to pronounce words where the accent is on the second or third syllable, there is a certain preparation of the larynx before the voice is raised, and this is its action being performed mutely, in order to produce voice during its re-action, as in the words—reply, approbation, &c. where what are called unaccented or unemphatic syllables are to be pronounced before those called accented or emphatic. It would tend much to distinctness if all who treat of language would adopt Mr. Joshua Steele’s term for this peculiar character of syllables, and call it the *heavy* poise, cor-

responding to the thesis of the Greeks ; and to call what is usually denominated unaccented syllables, *light poise*, corresponding to the arsis of the Greeks : the terms “*pulsation*” and “*remission*” have been suggested.

The voice is capable of producing low or high notes in the musical scale — which is effected, according to Dodart, by the change of the diameter of the glottis, the aperture being large for grave notes, and small for acute ones ; while Ferrein considers the pitch to depend upon the tension of the ligaments which form the sides of the glottis — that, if these be very tight, acute notes are produced, which are rendered grave according to their degree of relaxation. Now, admitting Richerand’s hypothesis to be correct, it will depend on the conjoined actions of change of diameter of the glottis, and the tension of its sides ; but, in the production of a different note of the musical scale, we find the whole larynx changes its place in the throat. Thus, for acute sounds it is carried upwards and forwards ; to produce the most acute sounds, the head is thrown back, which

allows a greater extent for its elevation, as may be observed in singers: this extent of motion is about one inch for two octaves. The fact may be proved by either performing the experiment before a looking-glass, or by placing a finger on the larynx and then sounding an acute note, when the elevation will be found to be in proportion to the acuteness.

This rising of the larynx shortens the distance between it and the lips, which is considered as a vocal tube, and its depression lengthens this vocal tube; and hence this is another condition requisite for alteration of the note, higher or lower, in the musical scale. This part of the mechanism is analogous to the ordinary pitch-pipe used by singers, which consists of a square tube, generally of mahogany, or some hard wood, with a sounding head, and provided with a graduated sliding plug, which, by insertion into the tube, shortens its length, and thus produces an acute sound: the slide fits air-tight into the tube. Now the distance from the larynx to the lips is the tube, which, instead of being shortened by a sliding plug, is shortened by the head-

piece (the larynx) sliding within the tube, and thus the same effect takes place—the tube is shortened, and acute notes are produced.

It is well known that the voice is altered by the density of the air; the vibrations depend on its elasticity, which is varied by the density. Thus on high mountains, where the air is attenuated, the voice is subdued to a whisper. In caverns and deep mines the contrary effect takes place. Any air heavier than ordinary would produce the same effect; but it destroys life. Compressed air, as that of a diving bell, however, will produce the effect.

The voice is also affected by the passions and feelings of the mind; as joy, anger, fear, love, &c.

When the cerebellum becomes capable of exercising its function, there is a change in the whole system, and during this change there is a great irregularity of voice; power over the tones seems to be lost, as it passes uncontrolled from grave to acute, loud to soft, harsh to shrill, and so on. This arises from

the change affecting some parts more than others, and so destroying the balance between them: but when the change has taken place, the voice becomes fuller, deeper, and more sonorous. This is called the *breaking* and *setting* of the voice.

This brief survey of the structure and function of the parts requisite for voice, will be sufficient for my present purpose. It is not necessary to enter minutely into the subject; and I shall therefore pass over the inquiry into secondary vibrations, and the consideration of the other modifications it receives, and immediately draw your attention to those parts essential to speech—the enunciative organs, which consist of those portions and members of the human mouth, by the motions, positions, and contact of which, the elementary character of literal sound is added to the impulse of voice. These are the ordinary organs of speech, which so far modify the stream of voice as to form those specific and contra-distinct elements, the articulation or joining of which form syllables and words, of which orations are composed.

The enunciative organs (independently of the lower jaw taken as a whole instrument) are six in number, viz. the uvula, tongue, lips, teeth, gums, and palate; they may be classed either as single and double organs, or passive and active, as—

SINGLE.	DOUBLE.		ACTIVE.	PASSIVE.
Tongue	Lips	or,	Tongue	Teeth
Uvula	Gums		Uvula	Gums
Palate	Teeth		Lips	Palate, or roof of the mouth.

The modifications which the voice receives from these organs constitute artificial language, wherever it may be spoken—whether it be the harmonious Italian, or the harsh Teutonic dialects of northern Europe.

Voice, then, and its modifications into speech, depend on certain actions produced by particular muscles, which actions are voluntary—that is, depending on the will of the individual. Now when the will is not able to control the muscles, to produce those actions requisite for the formation of either voice or speech, the defect is called an impe-

diment of speech ; which many consist in an indocility of the muscles to the will, when the structure is perfect, or of a malformed structure of the organs. This, then, is a natural division of impediments of speech. There are many individuals who find a difficulty in producing and continuing the voice, who find none in forming the produced voice into speech ; and, on the contrary, there are others who have complete command over the voice, but have no power in modifying it into speech : here, again, is another natural division of impediments into those of voice and speech, so that we may refer those of voice either into indocility of the muscles, which is deranged function, or into malformed structure ; and those of speech may also be classed under either of the heads to which it belongs.

In examining the various forms under which impediments of speech present themselves, we naturally inquire into the general causes, and also ascertain the proximate cause of each case, and lastly lay down a rational mode of cure.

The general appearance of stammerers on

attempting to speak, is a distorted countenance, flushed cheeks, swollen neck, the veins turgid, spasmodic affections of the upper and lower extremities, but principally of the upper, and if they are able at all to speak, it is, as Shakspeare says, “as wine comes out of a narrow mouthed bottle, either too much at once, or none at all.” This arises from anxiety to say as much as possible before the stammer recurs. But it is not easy to give a general view of the disease, because there are scarcely two cases alike—the diversity is endless, varying in degree from the mere hesitation to the utmost complication of organic malformation: thus, there are cases in which the symptoms are mild, and the disease is very severe; and others, in which the symptoms are much more severe than the disease, as is frequently the case with spasmodic closure of the glottis.

A predisposing cause of stammering may exist in a general nervous debility; and this may be brought on by fevers, terror, &c.: the affection has also been produced by the uncontrolled sway of the passions; to which may be added, perhaps its most fertile source, the unchecked manifestation of the imitative

faculty. How far stammering may be transmitted through families, is a question that has not as yet been solved ; but it is evident that a weakness of the nervous system may be hereditary, and that is certainly one cause which will predispose to it.

From the vague manner in which stammering has been attributed to mental and moral causes, much mischief to the sufferer has resulted. This will be evidenced in the following case :—

A gentleman labouring under spasmodic action of the glottis informed me, that he always felt more excited when he thought of the causes of stammering, “because,” said he, “people imagine when they hear me, that it is the result of either mental imbecility or moral turpitude.” When this impression was removed from his mind, he quickly threw off the impediment. It evidently arose from the vague manner of referring to such causes, which left much for the imagination to fill up. Where this notion exists, it may be removed by pointing out cases of defective utterance in highly moral and talented men,

and also by instances of good enunciation in idiots and criminals.

We find that persons who have any physical defect, are apt to construe remarks which are not meant for them, to be observations on their own case. The late Lord Byron was a remarkable instance of this. So it is with the stammerer ; he feels his defective utterance as a degrading badge, which, by silence, he endeavours to conceal ; but as silence cannot be maintained during intercourse with society, he is in a degree impelled to avoid company.

Those who in kindness endeavour to aid a stammerer, by saying the impeded word for him, do not assist him, but, on the contrary, impede him ; for, in the first place, they invariably dislike any word to be pronounced for them ; and, secondly, the uttering of the impeded word by the sympathizing individual, does not prevent his continued attempts, for he cannot proceed to the next, because such word is a connecting link to it ; he feels he cannot go on speaking without first pronouncing that particular word, which is frequently effected, as it were, by snatching

at it during inspiration. Besides, the ordinary agitation to speak without stammering is increased, for, by endeavouring to avoid a repetition of ill directed kindness, his efforts are concentrated to avoid faltering, and the mere want of a word to express an idea, will cause the stammer immediately to recur. Now this continually renewed excitement aggravates the disease, and the individual, feeling the disadvantages resulting from his incapacity of joining in conversation, and not unfrequently even of making himself understood, by those who are in possession of more perfect instruments of mental intercourse, are sufficient causes to sour the sweetest temper, and even to account for misanthropy.

It has been said, that there is the same hasty conception in all stammerers. Now we all conceive ideas faster than we can clothe them in language; therefore, there is the same hasty conception in all persons, whether they be stammerers, or have no such defect. It is quite an error to suppose that the minds of all stammerers are alike, or that there is the same cerebral organization in all cases; for the proud and vain, the superstitious and the

sceptic, the man of genius and the idiot, the well informed and the ignorant, are all subject to impediments of speech: I have seen persons with very varied combinations of cerebral organization suffering under defects of utterance. In fact, the capacities of stammerers differ both in kind and degree, so that the hypothesis of the similarity of their minds falls to the ground.

Impediments of speech have been classed under the two heads of malformed organs and functional derangements of perfect organs. In order to ascertain the division to which any particular case may belong, first ascertain if the patient can read or speak, if alone, or when not under excitement or embarrassment, for if there be the power to read or speak under such circumstances, it is only one of functional derangement; but if, on the contrary, the patient stammer under every circumstance, we may be certain that it arises from malformed organs. Having ascertained this, we have now to discover whether it be of the voice or speech. If the patient find a difficulty in producing voice, and when formed has no control over its continuance or

pitch, we may refer the defect to its organ, when it will be found to exist in the glottis, where all power of volition is either uncertain or lost; and, on the contrary, if there be no difficulty in producing voice, but merely a want of power in giving to that already formed the characteristic properties of lingual utterance, the defect may be referred to the organs of enunciation.

Under whatever impediment the patient may labour, although his case must be treated according to general principles, yet they will require to be modified and varied according to the necessities of that particular case. “It will always be found,” says Dr. Watson, speaking of defects of speech, “that a little shewing is worth a volume of written instructions,” and for this reason—sounds cannot be exhibited to the eye, they must be communicated by the ear: written instructions are very good auxiliaries, but even these must be adapted to the peculiarities of each case, otherwise they will be useless, if, indeed, they have not a worse tendency; for sometimes by such means an impediment is aggravated, instead of being relieved.

All voluntary motion is performed by the aid of the muscles, which is effected in a most extraordinary manner, by the power which the will has over them, called volition. Every muscular motion is the effect of volition, although we are not conscious of any direction of power for the common motion of the legs, as in walking, or of the arm, as in raising it to the head, or, in short, of any of the ordinary flexures of the body ; but if we attempt a new muscular motion of any part, we feel a difficulty in performing it ; that is, the will has not exerted its power over that particular train of muscles, and so we are conscious of a direction of power, or a distinct volition, to effect our wish. This is observable in young recruits under training in the military evolutions, and those who, advanced beyond childhood, are learning to dance, fence, the gymnastic exercises, to play on a musical instrument, &c. Thus, novices in dancing require to look at their feet to place them aright ; but after some practice, they find this unnecessary, and even feel unconscious of any act of volition in going through complicated dances : the first act of the will to perform any figure appears to excite to action the whole train of muscles employed for those particular motions.

So persons learning a foreign language, where the pronunciation differs from our own — as the French, for instance — exert, at first, a distinct volition for each sound ; after some practice, the habit is acquired of pronouncing the words with scarcely consciousness of exertion, until they become so familiar as for whole sentences to be produced, containing very complicated combinations of sound, by one act of volition, until they even think in the language. Those who are accustomed to teach languages find a great diversity in the power of correct pronunciation in different pupils : some acquire the power at first hearing the words, while others require not only considerable time, but even many efforts after the mechanical formation or position of the inner as well as the outer mouth are exhibited to the eye (in conjunction with the sound to the ear,) before they can gain the power : there are great differences in the power of volition in the same individual at different times.

Now, in impediments of the voice, it is evident the defect must be in the larynx, and when it is discovered to be a loss of power over its continuance, it will be found to arise

from a spasmodic closing of the glottis : such persons will generally be able to sing, and some to read poetry, without any impediment. The reason is this, that, in singing, the stream of voice never stops ; and, in reading poetry, it should seldom be interrupted : now, for the stream of voice to flow, it is necessary that the glottis remain open. In such cases, the loss of power of the will is over the muscles which open and shut it, and when the impediment recurs, a spasmodic closing of the glottis takes place. Various have been the remedies suggested for its cure. Some have proposed speaking in a singing tone ; others with the teeth closed. Dr. M'Cormac recommended inflating the lungs, and speaking with slowness and deliberation ; but as it does not arise from a want of air in them, this practice fails of success. Dr. Arnott was the first to point out the exact nature of the morbid affection, and thereby enable us to apply a remedy on a principle which before was empirical. This remedy is to produce a voice, by droning on any simple sound, as the *e* in *berry*, or more properly, the *ir* in *bird* ; by which means the glottis is opened, and the stream of voice is flowing through it, and there-

fore ready to be modified by the enunciative organs to form any words that may be desired : the only peculiarity will be a joining of all the words by the drone sound, which, as long as it is continued, will prevent the closure of the glottis, and consequently of the recurrence of the impediment. The peculiarity may be thus expressed in writing :—

e--“ Hail-e -- holy-e -- light-e -- offspring-e -- of-e -- heaven-e -- first born”- e--- &c.

Singers produce their first note in a song without the word, in a similar manner to the above, and so do many speakers, before they even begin to answer the simplest question : thus, some give the power of *m*, others *e*, and express a simple affirmative — “ *m*--yes,” “ *e*--yes.” So that the continuous voice or droning is in reality a very common practice ; but this peculiarity will be able to be thrown off as the patient recovers volition over the small muscles which move the glottis.

M. Bourdon (in his “ Recherches sur le méchanisme de la respiration,” &c. Par. 1820,) considers the glottis as performing many other

important offices, in addition to the formation of voice; as, for instance, it prevents the escape of air during considerable efforts by closing: thus the lungs are kept inflated, which increases our power: so that if we could divide the recurrent nerve, although we should give relief to this kind of stammer, we would deprive the patient of much power; he would, in fact, be incapacitated from making any considerable exertion.

The larynx is liable to disease like other parts of the body, which more or less affect the voice, all of which must be treated according to the nature of the affection; but in all cases of impediment of voice, it is of great importance to explain the laws of action of the larynx, in order to induce a regular action and re-action, in place of the hurried and irregular, which all impediments produce: by this means a relapse of the defect will not take place, because the irregular actions, which are the precursors of the morbid affection, are completely removed.

When the impediment arises from deranged or improper actions of any of the

enunciative organs, that organ which is improperly applied must be submitted to certain exercises adapted to obtain or restore its proper and healthy action. This cannot be gained suddenly ; it will require both time and attention. Some people, from attempting to correct several mal-actions simultaneously, have not effected any thing : they ought to be taken separately, and a right action will then be acquired in a much shorter period than is generally expected. If any of the organs of enunciation be malformed or defective, and hearing and intellect exist, elocutionary science alone, or combined with mechanical, will, even under such disadvantageous circumstances, ultimately overcome the defects.

The tongue and uvula are sometimes suffering under a diminution of sensibility, similar to that which takes place in intoxication, when the speech is affected in like manner. The tongue may be too large, when it is apt to protrude through the teeth, and produce lisping ; but this more frequently results from indocility or loss of power of the will over that organ.

The uvula, again, may be divided, as in fissure of the palate, and instances of its entire obliteration occur. In all these cases, the treatment must depend so much on accompanying circumstances, that I should be exceeding the limits of a “few observations” were I to enter into a discussion of their treatment; I therefore pass over the defects of the teeth, gums, palate, and mal-position of the jaw, by stating in general, that whatever peculiarities of formation may exist, which render the ordinary production of what are called articulate sounds impossible, recourse must be had to other means of enunciation; as, for instance, F and V are produced by the action of the under lip and upper teeth; but they may be formed by the upper lip and under teeth, if there be a necessity for it, by any accident of the under lip, or if the lower jaw project too far for the ordinary action.

Temporary relief may be given by a variety of expedients; but if the physical laws necessary for voice are not complied with, such relief will be but transient. Cases might be adduced where the relapse, arising from not



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